CLAIM AMENDMENTS

1. (Original) A linear actuator, comprising:

a motor;

a gear train;

an output pinion driven by the motor through the gear train, the gear train multiplying the torque of the motor to drive the output pinion;

an output rack drivably coupled to the output pinion to translate rotation of the output pinion to linear translation of the output rack;

a manual override mechanism having a first user accessible interface, the manual override mechanism operating in conjunction with the gear train to allow manual positioning of the output pinion and of the output rack; and

a manual locking mechanism having a second user accessible interface, the manual locking mechanism engaging the gear train to prevent rotation of the output pinion in a first rotary direction and to prevent linear translation of the output rack in a first linear direction.

2. (Original) The actuator of claim 1, further comprising a spring return mechanism including a clock spring coupled to the gear train, the clock spring being wound upon energization of the motor driving the output pinion in a rotary second direction and the rack in a second linear direction, the clock spring unwinding upon de-energization of the motor to drive the output pinion through a portion of the drive train in the first rotary direction to drive the output rack in the first linear direction.

3. (Original) The actuator of claim 2, wherein the manual override mechanism is coupled through the clock spring such that operation of the manual override to effect a rotation of the output pinion in the second rotary direction and to effect a linear translation of the output rack in the second linear direction winds the clock spring.

4. (Original) The actuator of claim 2, wherein the manual locking mechanism includes a segment gear head having a toothed portion and a smooth portion on a face thereof, the segment gear head being rotatable between a locked position wherein the toothed portion engages the gear train preventing rotation of the output pinion in the first rotary direction and linear translation of the output rack in the first linear direction, and an unlocked position wherein the smooth portion is positioned in association with the gear train and the toothed portion is disengaged from the gear train.

5. (Original) The actuator of claim 4, wherein the manual locking mechanism further includes a reset lock spring operatively coupled to the segment gear head to bias the segment gear head to the unlocked position.

6. (Original) The actuator of claim 5, wherein the segment gear head includes a slot adapted to accommodate a stop pin therethrough, the stop pin abutting against a first end of the slot in the unlocked position and abutting against a second end of the slot in the locked position.

7. (Original) The actuator of claim 5, wherein rotation at a point of engagement with the locking mechanism of the gear train under influence of the clock spring is in a direction to rotate the segment gear head against the reset lock spring force thereby maintaining the manual locking mechanism in the locked position.

8. (Original) The actuator of claim 5, wherein rotation at a point of engagement with the locking mechanism of the gear train under influence of the motor is in a direction to rotate the segment gear head in accord with the reset lock spring force thereby aiding the manual locking mechanism to achieve the unlocked position.

9. (Original) The actuator of claim 1, wherein the motor drives the output pinion in a second rotary direction and the output rack in a second linear direction to disengage the locking mechanism from the gear train to allow rotation of the output pinion in the first rotary direction and linear translation of the output rack in the first linear direction.

10. (Currently Amended) A locking mechanism for a motor driven linear actuator ~~having a gear train drivably coupling a motor to an output rack and pinion assembly to linearly drive a device~~, comprising:

a motor;

a gear train;

an output pinion driven by the motor through the gear train;

an output rack drivably coupled to the output pinion to translate rotation of the output pinion to linear translation of the output rack;

a segment gear head having a toothed portion and a smooth portion on a face thereof, the toothed portion configured to engage a gear in the gear train, the segment gear head being positioned in relation to the gear such that rotation of the segment gear head between a locked

position and an unlocked position results in engagement of the toothed portion with the gear in the locked position and disengagement of the toothed portion in the unlocked position, the segment gear head further defining a slot therethrough adapted to accommodate a stop pin therein, the slot being positioned in the segment gear head such that the stop pin abuts against a first end of the slot in the unlocked position and against a second end of the slot in the locked position;

a reset lock spring operably coupled to the segment gear head to bias the segment gear head to the unlocked position; and

a user interface coupled to the segment gear head to rotate the segment gear head between the locked and the unlocked positions.

11. (Original) The locking mechanism of claim 10, wherein the toothed portion of the segment gear head occupies approximately 25°.

12. (Original) The locking mechanism of claim 10, wherein the toothed portion is positioned in relation to the slot such that rotation of the gear train at a point of engagement with the locking mechanism is in a direction to rotate the segment gear head such that the stop pin engages the second end.

13. (Original) The locking mechanism of claim 10, wherein the reset lock spring is positioned such that engagement of the toothed portion of the segment gear head with the gear train when the actuator is driving the device to a closed position results in rotation of the segment gear head against the bias applied by the reset lock spring.

14. (Original) A spring return, motor driven linear actuator for driving a flow control device to an actuated position under power and to a fail-safe position upon loss of power, the actuator comprising:

a motor;

a speed reducing, torque multiplying gear train drivingly coupled to an output of the motor;

an output pinion drivingly coupled to the gear train, the output pinion being driven in a first rotary direction by the motor;

an output rack drivingly coupled to the output pinion, the output rack being driven in a first linear direction by the output pinion under influence of the motor;

a spring return mechanism including a clock spring coupled to the gear train, the clock spring being wound upon energization of the motor driving the output pinion in the first rotary direction, the clock spring unwinding upon motor de-energization to drive the output pinion through the drive train in a second rotary direction to thereby linearly translate the output rack in a second linear direction;

a manual override mechanism having a first user accessible interface, the manual override mechanism operating in conjunction with the spring return mechanism to allow manual positioning of the output pinion and of the output rack, and winding of the clock spring; and

a manual locking mechanism having a second user accessible interface, the manual locking mechanism engaging the gear train to prevent rotation of the output pinion in the second rotary direction and to prevent linear translation of the output rack in the second linear direction.

15. (Original) The actuator of claim 14, wherein the manual locking mechanism includes a segment gear head having a toothed portion on a face thereof, the segment gear head being rotatable between a locked position wherein the toothed portion engages the gear train preventing rotation of the output pinion in the second rotary direction and linear translation of the output rack in the second linear direction, and an unlocked position wherein the toothed portion is disengaged from the gear train.

16. (Original) The actuator of claim 15, wherein the manual locking mechanism further includes a reset lock spring operatively coupled to the segment gear head to bias the segment gear head to the unlocked position.

17. (Original) The actuator of claim 16, wherein the segment gear head includes a slot adapted to accommodate a stop pin therethrough, the stop pin abutting against a first end of the slot in the locked position thereby preventing further rotation of the segment gear head.

18. (Original) The actuator of claim 16, wherein rotation of the gear train at a point of engagement with the locking mechanism under influence of the clock spring is in a direction to rotate the segment gear head against the reset lock spring force thereby maintaining the manual locking mechanism in the locked position.

19. (Original) The actuator of claim 16, wherein rotation of the gear train at a point of engagement with the locking mechanism under influence of the motor is in a direction to rotate the segment gear head in accord with the reset lock spring force thereby aiding the manual locking mechanism to achieve the unlocked position.

20. (Original) The actuator of claim 14, wherein the motor kicks the output pinion in the first rotary direction to disengage the locking mechanism from the gear train to allow rotation of the output pinion in the second rotary direction and linear translation of the output rack in the second linear direction.